

REMARKS**INTRODUCTION:**

In accordance with the foregoing, claims 31, 44, 45, and 47 have been canceled without prejudice or disclaimer, and claims 1, 17, and 23 have been amended. No new matter is being presented, and approval and entry are respectfully requested.

Claims 1, 2, 13-17, 19, 21, 23, 24, 27, 30, and 38, 40, and 42 are pending and under consideration. Reconsideration is requested.

ENTRY OF AMENDMENT UNDER 37 C.F.R. §1.116:

Applicants request entry of this Rule 116 Response because:

(1) the amendments of claims 1, 17, and 23 should not entail any further search by the Examiner since no new features are being added or no new issues are being raised; and

(2) the amendments do not significantly alter the scope of the claims and place the application at least into a better form for purposes of appeal. No new features or new issues are being raised.

The Manual of Patent Examining Procedures sets forth in Section 714.12 that "any amendment that would place the case either in condition for allowance or in better form for appeal may be entered." Moreover, Section 714.13 sets forth that "the Proposed Amendment should be given sufficient consideration to determine whether the claims are in condition for allowance and/or whether the issues on appeal are simplified." The Manual of Patent Examining Procedures further articulates that the reason for any non-entry should be explained expressly in the Advisory Action.

ELECTION/RESTRICTION REQUIREMENT:

In the Office Action at pages 2-3, the Examiner imposes an election/restriction

requirement. As such, claims 31, 44, 45, and 47 have been withdrawn in view of the Examiner's constructive election of claims 1, 2, 13-17, 19, 21, 23, 24, 27, 30, 38, 40, and 42. As such, the applicants provisionally elect claims 1, 2, 13-17, 19, 21, 23, 24, 27, 30, 38, 40, and 42 (Species A) in response to the preliminary restriction requirement set forth in the Office Action.

Insofar as Species B is concerned, it is believed that claims 31, 44, 45, and 47 are so closely related to elected claims 1, 2, 13-17, 19, 21, 23, 24, 27, 30, 38, 40, and 42 that they should remain in the same application to preserve unity of the invention and to avoid any possibility of a double patenting issue arising at some later date. Even assuming arguendo that the Examiner's assertion as to the differences between the Species is correct, the Examiner has not set forth evidence that such distinctions, as characterized by the Examiner, are sufficient to maintain a prima facie requirement for a restriction/election.

Specifically, there have been no references cited to show any necessity for requiring an election/restriction. The Examiner has further not provided evidence, such as identified different classifications, which shows that the Examiner would face an undue burden in Examining both sets of claims in comparison, and that the burden outweighs the additional expense and delay to the Applicants in having to protect the additional subject matter recited by claims 31, 44, 45, and 47 by filing a divisional application.

MPEP §803 sets forth the criteria for restriction between patentably distinct inventions. (P) indicates that there must be a serious burden on the Examiner if restriction is required (see MPEP §803.02, §806.04(a)-§806.04(i), §808.01(a) and §808.02). This section of the MPEP also states that for purposes of the initial requirement, a serious burden on the Examiner may be prima facie shown if the Examiner shows by appropriate explanation either separate classification, separate status in the art, or a different field of search as defined in MPEP §808.02. The Examiner has not set forth any of these criteria or any other criteria for establishing that there would be a serious burden if restriction is required as compared to the

burden on the applicant so as to establish a prima facie restriction requirement.

As such, it is respectfully requested that the Examiner reconsider the election/restriction requirement.

OBJECTION TO CLAIM 1:

In the Office Action at page 3, the Examiner objects to claim 1 due to an apparent typographical error. In view of the accompanying amendment to claim 1, it is respectfully requested that the Examiner reconsider and withdraw the objection.

REJECTION UNDER 35 U.S.C. §103:

On pages 4-5 of the Office Action, the Examiner rejects claims 1, 2, and 38 under 35 U.S.C. §103 in view of Campanelli, Hawkins et al. (U.S. Patent No. Re: 32,572) (hereafter "Hawkins '572"), and Hawkins et al. (U.S. Patent No. 5,006,202) (hereafter "Hawkins '202"). The rejection is respectfully traversed and reconsideration is requested.

On page 4 of the Office Action, the Examiner asserts that the polymer layer 58 of Campanelli corresponds to the recited membrane of claim 1. On page 8 of the Office Action, the Examiner asserts that claim 1 does not positively recite spaces between the polymer layer 58 and the heating element substrate 36. As a point of clarification, claim 1 recites "adhering a membrane to the formed nozzle part and a heat driving part." The heat driving part includes "fluid *chambers* for corresponding fluid jetting apparatuses." The membrane "separates the fluid *chambers* of the heating driving part from the nozzle part." As such, while the Examiner is correct in that the word "space" is not recited, Campanelli does not disclose or suggest a chamber in the heating element substrate 36.

Further, the Examiner asserts that Campanelli discloses etched through holes 35 in the heating element substrate 36. However, as a point of clarification, Campanelli discloses that the

through holes 35 are in the thick film layer 58 in which the heating elements 34 are disposed. (Col. 6, lines 65-68 of Campanelli). As shown in FIG. 2, the heating element 34 is disposed on a top surface of electrodes 33 which are on top of the heating element substrate 36. As such, Campanelli further does not disclose that the through holes 35 are in the heating element substrate 36.

In contrast, claim 1 also recites that the "heat driving part includes fluid chambers for corresponding fluid jetting apparatuses."

Since Hawkins '572 and Hawkins '202 are not relied upon and do not disclose such a feature, it is respectfully submitted that the combination of Campanelli, Hawkins '572, and Hawkins '202 does not disclose or suggest the invention recited in claim 1.

Claims 2 and 38 are deemed patentable due at least to their depending from claim 1.

Rejection of claims 17 and 19

On pages 5-6 of the Office Action, the Examiner rejects claims 17 and 19 under 35 U.S.C. §103 in view of Leban (U.S. Patent No. 5,299,785) and Baise et al. (U.S. Patent No. 4,371,565). The rejection is respectfully traversed and reconsideration is requested.

On page 5 of the Office Action, the Examiner asserts that a photo resist layer 12 of Leban corresponds to the membrane recited in claim 17. On page 9 of the Office Action, the Examiner asserts that FIG. 1G shows that the photoresist layer 12 is adhered to a nozzle part and a heat driving part 34, 39.

By way of review, as shown in FIG. 1G, the photo resist layer 12 contacts a plastic material 14, into which an orifice opening 20 is formed. However, the photo resist layer 12 does not contact the thin film substrate 34 or the heater resistor element 36 so as to be adhered to the thin film substrate 34. Thus, Leban does not disclose the photo resist layer 12 contacting the plastic material 14 and the thin film substrate 34 so as to be adhered to both the plastic material 14 and the thin film substrate 34.

However, in order to clarify an existing limitation, claim 17 now recites “adhering the membrane with the adhered nozzle part to a heat driving part such that the membrane is between the heat driving part and the nozzle part to form the fluid jetting apparatuses as an undivided unit.” Since Baise et al. is not relied upon and does not disclose such a feature, it is respectfully submitted that the combination of Leban and Baise et al. does not disclose the invention recited in claim 17.

Claim 19 is deemed patentable due at least to its depending from claim 17.

Rejection of claim 23

On pages 6-7 of the Office Action, the Examiner rejects claim 23 under 35 U.S.C. §103 in view of Leban, Baise et al., and Tsung Pan (U.S. Patent No. 4,894,664). The rejection is respectfully traversed and reconsideration is requested.

As an initial matter, Tsung Pan is not relied upon and does not disclose the recited membrane of claim 17. As such, the combination of Leban, Baise et al., and Tsung Pan does not disclose or suggest the invention recited in claim 23 due at least to the combination not disclosing the invention recited in claim 17, from which claim 23 depends.

Further, on page 9 of the Office Action, the Examiner asserts that claim 23 does not define a relationship between top and bottom sides such that a location of the heating element can be said to be on any side. As a point of clarification, claim 23 recites “forming driving fluid barriers on the electrodes and the heat elements.” Claim 23 further recites “forming driving fluid chambers *between corresponding pairs of the driving fluid barriers*.” Claim 23 additionally recites that the electrodes and the heat elements form “bottom *sides* of the corresponding driving fluid chambers.” As such, the bottom side has a recited relationship in terms of the driving fluid chambers.

On page 6 of the Office Action, the Examiner asserts that the beams 12 and the resistive layers 15 of Tsung Pan correspond to the recited driving fluid barriers and the heat driving

elements of claim 23. However, as shown in FIG. 3, Tsung Pan discloses the resistive layer 15 being on top of the beams 12. Further, the beams 12 define gaps connecting the well 11 and nozzle area 17. As such, the beams 12 define gaps, but the resistive layers 15 are on the beams 12 and do not form a side of the gap between the beams 12.

In contrast, claim 23 recites "forming driving fluid chambers between corresponding pairs of the driving fluid barriers with the electrodes and the heat elements forming *bottom sides of the corresponding driving fluid chambers*." In order to further clarify the geometry as would have been understood by one of ordinary skill in the art, claim 23 also recites "each of the bottom sides being between the corresponding pair of the driving fluid barriers." Since Leban and Baise et al. are not relied upon and do not disclose such a feature, it is respectfully submitted that the combination of Leban, Baise et al., and Tsung Pan does not disclose or suggest the invention recited in claim 23.

Rejection of claim 40

On pages 7-8 of the Office Action, the Examiner rejects claim 40 under 35 U.S.C. §103 in view of Leban, Tsung Pan, and Campanelli. The rejection is respectfully traversed and reconsideration is requested.

On page 10 of the Office Action, the Examiner relies upon Campanelli as disclosing separating the fluid jetting apparatuses using a dicing blade. Even assuming arguendo that the Examiner is correct, it is respectfully submitted that Campanelli does not disclose "adhering the membrane with the adhered nozzle part to a heat driving part such that the membrane is between the heat driving part and the nozzle part to form the fluid jetting apparatuses as an undivided unit" as recited in claim 17, from which claim 40 depends. As such, it is respectfully submitted that the combination of Leban, Tsung Pan, and Campanelli does not disclose or suggest the invention recited in claim 40 due at least to the combination not disclosing the invention recited in claim 17, from which claim 40 depends.

STATUS OF CLAIMS NOT REJECTED IN OFFICE ACTION:

On page 10 of the Office Action, the Examiner allows claims 13-16, 21, 24, 27, 30, and 42.

ATTACHMENT:

Attached hereto is a "Version With Markings to Show Changes Made," comprising a marked-up version of changes made to the Claims by the current amendment.

CONCLUSION:

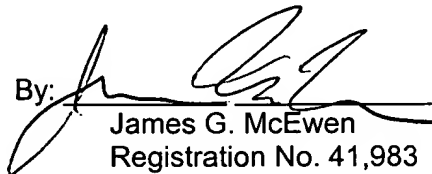
In accordance with the foregoing, it is respectfully submitted that all outstanding objections and rejections have been overcome and/or rendered moot. And further, that all pending claims patentably distinguish over the prior art. Thus, there being no further outstanding objections or rejections, the application is submitted as being in condition for allowance which action is earnestly solicited. At a minimum, this Amendment should be entered at least for purposes of Appeal as it either clarifies and/or narrows the issues for consideration by the Board.

If the Examiner has any remaining issues to be addressed, it is believed that prosecution can be expedited and possibly concluded by the Examiner contacting the undersigned attorney for a telephone interview to discuss any such remaining issues.

If there are any additional fees associated with the filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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VERSION WITH MARKING TO SHOW CHANGES MADE

IN THE CLAIMS:

Please **AMEND** claim 1, 17, and 23, and **CANCEL** claims 31, 44, 45, and 47 without prejudice or disclaimer, as follows. The remaining claims are reprinted, as a convenience to the Examiner, as they presently stand before the U.S. Patent and Trademark Office.

1. (THREE TIMES AMENDED) A process of manufacturing a plurality of fluid jetting apparatuses at once, comprising:

- forming a nozzle part by a spinning process; and
- adhering a membrane to the formed nozzle part and a heat driving part to position the heat driving part, the membrane and the nozzle part in order to form the fluid jetting apparatuses in a shape of an undivided wafer to be split into separate fluid jetting apparatuses,

wherein

- the heat driving part includes fluid chambers for corresponding fluid jetting apparatuses, and
- the membrane separates the fluid chambers of the [heating] heat driving part from the nozzle part.

2. (AS ONCE AMENDED) The process of manufacturing a plurality of fluid jetting apparatuses as claimed in claim 1, further comprising:

- forming electrodes and heating elements on a first substrate of wafer;
- forming driving fluid barriers on the electrodes and the heating elements; and
- forming the fluid chambers in the driving fluid barriers, to form the heat driving part.

3-12 (PREVIOUSLY CANCELED)

13. (AS ONCE AMENDED) A process of manufacturing a plurality of fluid jetting apparatuses, comprising:

forming electrodes and heat elements on a first substrate of silicon wafer, forming driving fluid barriers on the electrodes and heat elements, and driving fluid chambers in the driving fluid barriers, to form a heat driving part;

forming a polyimide coating layer on a second substrate of silicon wafer, forming an adhesive polyimide coating layer on the polyimide coating layer, attaching a first reinforcing ring to the adhesive polyimide coating layer, and separating the polyimide coating layer from the second substrate after attaching the first reinforcing ring on the adhesive polyimide coating layer, to form a membrane;

attaching a second reinforcing ring beneath a third substrate of silicon wafer by a spinning process, forming a nozzle plate on an opposite side of the third substrate from that of the second reinforcing ring, forming jetting fluid barriers on the nozzle plate, forming jetting fluid chambers in the jetting fluid barriers, and forming nozzles in the nozzle part;

adhering the polyimide coating layer of the membrane to the jetting fluid barriers, and separating the second reinforcing ring and the third substrate of silicon wafer, from the nozzle plate; and

adhering the adhesive polyimide coating layer of the membrane to the driving fluid barriers of the heat driving part.

14. (NOT AMENDED) The process of manufacturing a plurality of fluid jetting apparatuses as claimed in claim 13, wherein the forming of the polyimide coating layer on the second substrate and the forming of the adhesive polyimide coating layer on the polyimide

coating layer are accomplished by the spinning process.

15. (NOT AMENDED) The process of manufacturing a plurality of fluid jetting apparatuses as claimed in claim 13, wherein the forming of the nozzles in the nozzle plate is accomplished by using a laser beam from a treating apparatus.

16. (NOT AMENDED) The process of manufacturing a plurality of fluid jetting apparatuses as claimed in claim 13, wherein the forming of the nozzles in the nozzle plate is accomplished by a process of reactive ion etching.

17. (FOUR TIMES AMENDED) A process of manufacturing a plurality of fluid jetting apparatuses at once, comprising:
forming a nozzle part on a silicon wafer by a spinning process;
adhering the nozzle part with the silicon wafer to a membrane;
removing the silicon wafer from the nozzle part; and
adhering the membrane with the adhered nozzle part to a heat driving part such that the membrane is between the heat driving part and the nozzle part to form the fluid jetting apparatuses as an undivided unit.

18. (PREVIOUSLY CANCELED)

19. (NOT AMENDED) The process of manufacturing a plurality of fluid jetting apparatuses as claimed in claim 17, wherein the forming of the nozzle part comprises:
forming a nozzle plate on a first substrate by the spinning process;
forming jetting fluid barriers on the nozzle plate by the spinning process;
forming a first reinforcing element on the first substrate;

forming jetting fluid chambers in the jetting fluid barriers; and
forming nozzles in the nozzle plate.

20. (PREVIOUSLY CANCELED)

21. (AS ONCE AMENDED) A process of manufacturing a plurality of fluid jetting apparatuses at once, comprising:

forming a nozzle part on silicon wafer by a spinning process, the forming the nozzle part comprising:

forming jetting fluid barriers on the nozzle plate by the spinning process;

forming a first reinforcing element on the first substrate;

forming jetting fluid chambers in the jetting fluid barriers; and

forming nozzles in the nozzle plate;

forming a membrane, the forming the membrane comprising

forming a polyimide coating layer on a second substrate of silicon wafer;

forming an adhesive polyimide coating layer on the polyimide coating layer;

forming a second reinforcing element on the adhesive polyimide coating layer;

and

separating the polyimide coating layer from the second substrate after forming the second reinforcing element on the adhesive polyimide coating layer;

adhering the nozzle part with the silicon wafer to the membrane;

removing the silicon wafer from the nozzle part; and

adhering the membrane to a heat driving part.

22. (PREVIOUSLY CANCELED)

23. (TWICE AMENDED) The process of manufacturing a plurality of fluid jetting apparatuses as claimed in claim 17, further comprising forming the heat driving part, the forming the heat driving part comprising:

forming electrodes and heat elements on a substrate of another silicon wafer;

forming driving fluid barriers on the electrodes and the heat elements; and

forming driving fluid chambers between corresponding pairs of the driving fluid barriers with the electrodes and the heat elements forming bottom sides of the corresponding driving fluid chambers, each of the bottom sides being between the corresponding pair of the driving fluid barriers.

24. (NOT AMENDED) The process of manufacturing a plurality of fluid jetting apparatuses as claimed in claim 21,

forming the heat driving part, comprising

forming electrodes and heat elements on a third substrate of silicon wafer;

forming driving fluid barriers on the electrodes and the heat driving elements; and

forming driving fluid chambers in the driving fluid barriers.

25-26. (PREVIOUSLY CANCELED)

27. (AS THREE TIMES AMENDED) A process of manufacturing a plurality of fluid jetting apparatuses, comprising:

forming a nozzle part on a first substrate of silicon wafer by a first spinning process;

forming a membrane on a second substrate of silicon wafer by a second spinning process;

forming a heat driving part by forming electrodes and heat elements on a third substrate of silicon wafer;

removing first, second, and third substrates from the corresponding formed nozzle part, membrane, and heat driving part; and

adhering the nozzle part to the membrane, and the membrane to the heat driving part to form the fluid jetting apparatuses as an undivided piece to be separated into individual fluid jetting apparatuses.

28-29. (PREVIOUSLY CANCELED)

30. (AS ONCE AMENDED) The process of manufacturing a plurality of fluid jetting apparatuses as claimed in claim 27, wherein:

the forming of the electrodes on the third substrate is performed by a lithography process or a wet etching process; and

the forming of the heat elements on the third substrate is performed by the lithography process, the spinning process or a lift-off process.

31. (CANCELLED)

32-37 (PREVIOUSLY CANCELED).

38. (NOT AMENDED) The process of claim 1, further comprising splitting the fluid jetting apparatus in the form of the wafer into separate fluid jetting apparatuses.

39. (PREVIOUSLY CANCELED)

40. (NOT AMENDED) The process of claim 17, further comprising splitting the adhered nozzle part, membrane, and heat driving part into separate fluid jetting apparatuses.

41 (PREVIOUSLY CANCELED)

42. (NOT AMENDED) The process of claim 27, further comprising splitting the adhered nozzle part, membrane, and heat driving part into separate fluid jetting apparatuses.

43. (PREVIOUSLY CANCELED)

44. (CANCELLED)

45. (CANCELLED)

46. (PREVIOUSLY CANCELED)

47. (CANCELLED)